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Cole Crocker-Bedford
Chief, Natural Resources Branch
Grand Canyon National Park
P.O. Box 129
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Dear Cole;

In early July of this year, Mary Lou Fairweather met with Don Bertolette, Hazard Tree Coordinator GCNP, to assess hazard trees at Indian Gardens, Phantom Ranch and Bright Angel Campground. These areas have been surveyed for hazard trees numerous times over the past 15 years with subsequent pruning and tree removal. Nevertheless, branch and trunk failures have continued to occur because mature cottonwoods in these sites are structurally unsound. Cottonwoods are short-lived species that are extremely susceptible to decay, which allows large branches to drop without warning. An additional problem has developed in these sites due the pruning of large structural limbs between nodes, or branches, which was done in order to reduce the weight of large structural limbs and decrease the risk of failure. The entire limb or tree would not have to be removed and it could still provide shade. Proper pruning cuts are made at a point at which one branch or twig attaches to another. When a tree is pruned improperly, new branches form from epicormic sprouts but they are weakly attached to a stem (Figure 1). The original stem starts to decay because of the wound created from improper pruning. The epicormic sprouts grow into large limbs very quickly, providing the necessary shade, but soon fail due to the precarious attachment.

Figure 1. Epicormic sprouting following improper pruning.

A tree is hazardous if it has both a structural defect that could cause the tree to fail, and a target to strike if it was to fail. A formal hazard tree survey consists of evaluating all trees within range of campground site, rest area, building, etc, for defects. Since a formal survey was conducted by Mary Lou and Jerry Hoddenbach in the early 1990's, followed by removal of hazards, this time Mary Lou and Don surveyed only large cottonwoods showing signs of dieback and other structural defects. The main boles and roots of trees were examined for outward signs of decay, such as wounds, and the crowns of trees examined for limb and leader defects. The structure (size and lean) of limbs were also considered due to the propensity of large limbs to fail. This letter provides a summary of what Mary Lou and Don found. Don has the specifics on tree location and recommended action.

At Indian Gardens Mary Lou and Don targeted 4 cottonwood trees for pruning and 2 for removal. The latter are structurally in such bad shape that corrective pruning would result in tree death so complete tree removal is the preferred option. An alternative action for all is to remove the targets (i.e. redirect people). It is a very difficult situation. People need shade, yet the shade trees at Indian Gardens are getting older with a greater risk of failure.

Some of the recommended pruning cuts are targeted at reducing the weight of limbs in order to lessen the risk of failure. This means some cuts will not be proper and will result in the development of more epicormic sprouts. Mary Lou and Don took a conservative approach in order to retain some shade, but since some of this type of pruning will result in the development of a greater number of weakly attached branches, however, this should be considered a short-term fix.

Figure 2. Declining cottonwood in day-use area.

Cottonwoods in the now closed day-use area at Indian Gardens were also evaluated. Many trees have fallen down and many more are in decline (Figure 2). This area is considered a high failure area that would need major trees removal if it were to be safe.

At Phantom Ranch and Bright Angel Campground 11 trees were identified for removal and 28 for pruning of live and/or dead limbs. These trees are located over buildings, rest areas, trails, and campsites. Most cottonwoods are showing signs of decline, marked by branch dieback and limb failure (Figures 3 and 4). As stated above, much of the suggested pruning is a short term fix.

Figure 3. Crown decline of Cottonwood at Ranger Cabin.

Figure 4. Declining trees at Phantom Ranch.

Due to the decadence of mature trees in Indian Gardens, Bright Angel and Phantom Ranch recreation areas, there is a general need for replacement trees. Although some planting has taken place over the past 10 years, more is needed where cottonwoods are declining. It is highly recommended that all three recreation sites in the Canyon have a vegetation management plan.

The purpose of the plan is to recognize the existing tree cover and outline a desired future condition for the next 50 years. A vegetation management plan provides steps necessary to reach a desired condition. This plan could include the planting of low hazard tree species and building shade structures to replace decadent high risk trees. Low hazard trees native to these specific areas are hackberry in Indian Gardens and boxelder and honey mesquite in the Phantom Ranch and Bright Angel areas. The key is to go with trees that form low profile crowns and not those that form large lateral limbs. Once seedlings are established be sure and use deep infrequent watering practices so trees establish deep wide roots.

There is a young Arizona sycamore in the Phantom Ranch area that is doing very well and will be a great source of shade in a few more years. However, Arizona sycamore trees do form the same large lateral branching pattern similar to cottonwoods and are also susceptible to decay. Future hazard problems can be reduced by having this tree pruned properly by a professional arborist, before problems develop.

If you have any questions about this report please contact Mary Lou directly at (928)556-2075.

Sincerely,

/s/ Mary Lou Fairweather (for)
JOHN ANHOLD
Arizona Zone Leader Forest Health

cc: MaryLou Fairweather, Debra Allen-Reid